A Link to the Future: Ostracism's Effects on Aggressive Behavior

Senior Research Thesis

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by

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Abstract

Ostracized individuals, those who are excluded and ignored, respond with aggression towards others. But, research also suggest ostracism can instead lead to a prosocial reaction. It is possible that the response to ostracism could be moved towards one extreme (aggression) or the other (prosocial) if participants are first led to believe that their personality characteristics encourage these behaviors. Previous research indicates giving false feedback about one's personality characteristics (including aggression) can lead to changes in self-perception and performance on subsequent tasks. This study will examine how changing one's perceptions about their trait aggressive and prosocial tendencies will in turn affect current aggressive and prosocial responses to harmful social situations (i.e., ostracism). That is, if individuals are swayed to believe they can be aggressive, will that encourage them to actually be aggressive? The present study hypothesizes that those who are given a false future forecast of aggressive tendencies will be more tempted toward aggressive behaviors following ostracism than towards prosocial or neutral behaviors, whereas those given a false future forecast of prosocial tendencies will be more tempted toward prosocial than aggressive behaviors. Participants (n = 561) completed questionnaires assessing personality characteristics, then were randomly assigned to complete a recall task in either an ostracism (n = 267) or an inclusion (n = 294) condition. They then received two pieces of feedback: true feedback about one of their big five characteristics and false feedback about future aggressive, either physical aggression (n = 176) or social aggression (n = 188), or prosocial (n = 197) tendencies. Finally, participants completed measures of the negative response to ostracism (social pain, negative affect, fundamental needs) and the Tangram Help/Hurt Task to assess aggressive tendencies. Results indicated ostracism negatively affected fundamental needs, mood, and social pain compared to inclusion, but the false feedback

condition did not affect these outcomes. Few significant results were seen with aggressive responses following ostracism. Future research should examine whether participants need a direct target for aggressive tendencies following ostracism and if researchers need to create false aggressive and prosocial feedback that are equally believable to participants to see significant between-groups differences.

Ostracism, the experience of being excluded and ignored, is a fundamentally negative experience. It has widespread consequences for health and well-being, mood, and one's sense of self and relationships with others. It even leads to aggressive actions towards others. But not everyone responds to ostracism with aggression. Some instead engage in prosocial behaviors following an experience of ostracism. What leads to a prosocial versus aggressive response to ostracism? Can we increase the likelihood that someone responds with aggression by changing self-perceptions? The present study examines whether how individuals think about their aggressive or prosocial tendencies can change the response to ostracism to be more aggressive or prosocial.

Ostracism

Ostracism is defined as the act of being ignored and excluded, either by an individual or by a group (Williams & Jarvis, 2006; Wolfer & Scheithauer, 2018). Ostracism can occur through a number of different ways, such as when a group of students leaves an individual student out of their conversation. Ostracism can also be used to gain control in a social relationship or to correct behaviors that go outside of the group "norm" (Wolfer & Scheithauer, 2018). For example, individuals may use a form of ostracism, the "silent treatment," to create group conformity (Williams, Shore, & Grahe, 1998). Additionally, ostracism can include being excluded and ignored in online settings, such as in group communications (Williams et al., 2002). Ostracism can also occur without explanation or any explicit negative attention (Liu, Huo, Chen & Song, 2018). Such forms of ostracism can occur, for example, when an individual does not make eye contact with another individual. Avoidant eye contact, even from a stranger, has a negative effect on individuals (Wesselmann, Cardoso, Slater & Williams, 2012).

Ostracism is, unfortunately, a relatively frequent occurrence in daily life that can lead to varied outcomes. Individuals may experience at least one act of ostracism per day (Wölfer & Scheithauer, 2018), with some experiencing significantly more than that. Ostracism becomes chronic if someone is continually excluded and ignored (Iannone, McCarty, Branch, & Kelly, 2018). Ostracism leads some individuals to commit aggressive acts towards the ostracizer or towards others unrelated to the ostracism (Chen et al., 2012; DeBono & Muraven, 2014; DeWall, Twenge, Bushman, Im, & Williams, 2010; Leary, Kowalski, Smith, & Phillips 2003; Leary, Twenge, & Quinlivan, 2006; Rajchert & Winiewski, 2016; Ren, Wesselmann, & Williams, 2018; Wölfer & Scheithauer, 2018). But, this threat of chronic ostracism can lead to a more positive outcome. It can motivate people to reaffirm their acceptance of others and satisfy their need to belong (Iannone et al., 2018), leading to a potential positive (prosocial) rather than strictly negative (aggressive) response to ostracism.

Measuring and Manipulating Ostracism

There are several ways to assess and manipulate ostracism in lab-based settings. Recall paradigms are frequently used to assess previous experiences of ostracism. In these tasks, participants are asked to recall a previous event in which they were excluded and ignored by someone, in turn writing about their experiences (Riva, Wirth, & Williams, 2011). Writing about this prior experience results in concurrent lowered ratings of current fundamental needs and mood (see below). Completion of the Chronic Ostracism Experiences Questionnaire, which includes items such as “people ignore me,” is also used to assess past ostracism experiences (Iannone, McCarty, Branch, & Kelly, 2018). Participants are tasked with scoring items from the questionnaire the types of ostracism they have previously experienced.

Ostracism can also be manipulated in-the-moment with a game such as Cyberball (Williams & Jarvis, 2006). Cyberball was created after a researcher played an impromptu game of Frisbee in a park and was then ostracized by the strangers he was playing with. The original iteration of Cyberball involved having research participants play a ball-tossing game with two confederates while waiting for the "real" research study to start. Those confederates would either include or ostracize the actual participant. Cyberball was then retooled into a computerized task. The participant takes part in a virtual game of toss with two avatars who can choose who to throw the ball to next (Williams & Jarvis, 2006). The confederate computer avatars are programmed to either pass the ball to the participant an equal number of times (inclusion) or to pass the ball to the participant once and never again (ostracism). There are no differences in the negative effects of ostracism between in-person and online manipulations using Cyberball (Filipkowski & Smyth, 2012; Williams, Cheung, & Choi, 2000), indicating that it is a valid in-person and online manipulation of ostracism and inclusion (Dvir, Kelly, & Williams, 2019).

The Consequences of Ostracism

Ostracism has numerous effects on an individual, most notably on the experience of fundamental needs. Fundamental needs are central to psychological well-being and are part of self-determination theory (Howell & Sweeny, 2019). This theory states that there are three needs that humans require in order to function. One need is a need for autonomy, which is a feeling of control over one's own behavior (Howell & Sweeny, 2019). Another need is a feeling of competence, referring to a feeling of knowing what you are supposed to be doing and how to do it. The final need in self-determination theory is a need for relatedness—being connected to and supported by others. Connecting with others (inclusion) helps to fulfill each of these needs, whereas experiencing ostracism can threaten these fundamental needs.

With regard to ostracism research, there are four fundamental needs most often examined: belonging (e.g., Baumeister & Tice, 1990) control (Bandura, 1997), meaningful existence (Solomon, Greenberg & Pyszczynski, 1991), and self-esteem (Greenberg et al., 1992; Williams & Warburton, 2003). Belonging refers to the feeling of existing and being a part of someone's life (Williams et al., 2005). This need is especially threatened by the "silent treatment," in which an individual acts as though the target of their ostracism does not exist (Williams et al., 2005). The need for control revolves around an individual's perceived ability to control their environment (Williams et al., 2005). Meaningful existence is a fundamental need in which individuals have to buffer their fear of mortality (Williams et al., 2005). Often individuals derive meaningful existence from their own personal worldview, shoring up their fears of death (Williams et al., 2005). Self-esteem refers to how individuals perceive themselves in the eyes of others (Williams et al., 2005). That is to say, self-esteem is how others feel they are valued by others (Williams et al., 2005).

Various self-report measures exist to assess fundamental needs post-Cyberball, including the Need to Belong scale (Leary, Kelly, Cottrell & Schreindorfer, 2012), the Need Satisfaction Scale (Schultz, Ryan, Niemiec, Legate & Williams, 2015), and the Basic Needs scale (Williams et al., 2000). Utilizing these measures, researchers consistently find ostracized participants report lower levels of meaningful existence, control, belonging, and self-esteem than included participants (e.g., Iannone et al., 2018; Paolini, Pagliaro, Alparone, Marotta, & van Beest, 2017; Riva et al., 2011). Ostracism frustrates the need to belong and the need to feel control over one's environment, reduces meaningfulness of life, and harms self-esteem (Rajchert & Winiewski, 2016).

There is also evidence that ostracism causes social pain. Social pain refers to the experience of feeling pain not attributed to physical causes, but rather to the loss of (or potential loss of) a social or relational connection (Eisenberger, 2012). Neuroimaging results indicate that the perception of social pain is related to activation in the anterior cingulate cortex (Onoda, 2010). Physical pain is also experienced in the brain in the anterior cingulate cortex, among other areas, and this same area activates (i.e., experiences greater pain) during an ostracizing experience (e.g., Eisenberger, Lieberman, & Williams, 2003; Kross, Egner, Ochsner, Hirsch, & Downey, 2007). In non-neuroimaging studies, individuals self-report greater levels of social pain following ostracism than inclusion utilizing numerical rating scales ("how much pain did you feel") or the Short-Form McGill Pain Questionnaire (Donate et al., 2017; Okdie & Wirth, 2018; Riva et al., 2011). Another study found that acetaminophen, a common painkiller, but not glucose can reduce the social pain felt following ostracism (Miller, Bourrasseau, Williams & Molet, 2014). Thus, ostracism is a painful experience.

Studies found individuals experience negative feelings following ostracism. Negative mood comes in a number of different forms, ranging from anger to sadness to apathy. Experiencing ostracism can lead to a significant increase in negative mood compared to experiencing inclusion, including following the Cyberball task (van Beest, Carter-Sowell, van Dijk, & Williams, 2012; Wesselmann, Bagg, & Williams, 2009; Williams & Zadro, 2001; Wirth, Lynam, & Williams, 2010; Zoller, Maroof, Weik, & Deinzer, 2010). Taken together, ostracism significantly, negatively, affects mood, fundamental needs, and overall well-being.

Ostracism and Aggressive versus Prosocial Behaviors

The previously described immediate reactions to ostracism (negative mood, social pain, lowered fundamental needs) affect subsequent responses to ostracism. For example, ostracized

individuals may engage in behaviors to regain the lowered fundamental needs. These behaviors could be considered prosocial in nature. Other ostracized individuals may engage in behaviors that act upon negative mood and social pain, instead increasing aggressive behaviors towards others rather than acting prosocially. Ostracism frustrates the basic need to belong as well as the need to feel in control over one's environment (Rajchert & Winiewski, 2016). This frustration often leads to increased aggression (Rajchert & Winiewski, 2016). On the other hand, ostracism also thwarts the human need for positive, long-lasting relationships (Chen, DeWall, Poon & Chen, 2012). These competing demands, frustration from a lack of control leading to aggression and frustration from lack of connectedness leading to prosocial acts, can lead to either aggressive (Chen et al., 2012) or prosocial responses in the short-term. Individuals may experience fear and distress when they are ostracized because of its threats to one's fundamental needs (Liu et al., 2018), and this fear may be expressed as either aggression or as activities to increase connectedness with others.

Aggression is an act of harm toward another person (Rajchert & Winiewski, 2016). The perpetrator of aggressive behaviors must believe that they are causing harm to their target and that the target would be motivated to avoid the harm they are directing at them (Rajchert & Winiewski, 2016). Aggression can be provoked by a stressful or aversive situation that may or may not be caused by the target of the aggression (Rajchert & Winiewski, 2016). The foiled need to feel control over one's environment can cause an aggressive reaction (Rajchert & Winiewski, 2016), almost as a means of regaining an element of control over the environment. One situation that can foil the need to be in control of one's environment is being ostracized (Rajchert & Winiewski, 2016; Wölfer & Scheithauer, 2018). A feeling of disrespect may increase aggressive responses in individuals when they are ostracized (DeBono & Muraven, 2014). Across multiple

studies, even a single experience of ostracism increases aggressive behaviors (Chen et al., 2012; DeBono & Muraven, 2014; DeWall, Twenge, Bushman, Im, & Williams, 2010; Leary, Kowalski, Smith, & Phillips 2003; Leary, Twenge, & Quinlivan, 2006; Rajchert & Winiewski, 2016; Ren, Wesselmann, & Williams, 2018; Wölfer & Scheithauer, 2018).

On the other hand, some research suggests that experiencing ostracism instead leads to increased prosocial behaviors. In spite of the many adverse effects caused by ostracism, some individuals conform to group decisions in an attempt to be included and treated well by other group members (Leiro & Zwolinski, 2014), or to regain connectedness. This behavior can include treating other group members well and attempting to make friends with them (Leiro & Zwolinski, 2014). One of the factors thought to moderate or lessen the negative outcome of individuals who are ostracized is a concern for the future (Leiro & Zwolinski, 2014). This belief can include a desire to sacrifice immediate happiness now for favorable future outcomes (Leiro & Zwolinski, 2014) and can lead to different post-ostracism responses (i.e., greater future focus, greater prosocial behavior; Balliet & Ferris, 2013). Prosocial responses to ostracism can be adaptive as they help those ostracized to be re-included into the group they had been ostracized from (Leiro & Zwolinski, 2014). To summarize, ostracism can lead individuals to adapt a more prosocial attitude with a goal of being accepted back into the group that ostracized them.

A series of studies conducted by Maner, DeWall, Baumeister, and Schaller (2007) examined why people reacted prosocially versus aggressively towards others after experiencing ostracism. In their first study, social exclusion (ostracism) increased the desire to meet new people and connect with others (prosocial outcome). In the second study, participants were given false feedback regarding their social future, in that they would either be accepted or accident prone in the future. Participants threatened with a future of loneliness sought out the

companionship of others compared to those given a future inclusion forecast. This fear of potentially missing out on social connection in the future drove the tendency to seek out social connection in the present. The remaining studies further solidified the idea that prosocial or more inclusive outcomes can occur following ostracism, likely led by a desire to connect with others, and that fear of social rejection may be the factor that differentiates between prosocial and aggressive responses to ostracism.

False Feedback and the Future-Alone Paradigm

One additional way that researchers can manipulate the experience of ostracism is to provide false feedback about a participant's personality and future relationships. The Future-Alone manipulation was used in multiple studies of social exclusion to affect individuals' perceptions of their social future and its impact on individual's relationships (Hames et al. 2018).

The Future-Alone paradigm provides participants with false feedback about either positive or negative future relationships. In one early study, researchers investigated an individual's response to ostracism via one of three types of false feedback on a personality test (Twenge, Baumeister, Tice & Stucke, 2001). In the Future-Alone condition, participants were given feedback indicating that they would experience a decrease in their relationships with others in future years ("You're the type who will end up alone later in life. You may have friends and relationships now, but by your mid 20s most of these will have drifted away;" Twenge et al., 2001). In the Future-Belonging condition, participants were instead given false feedback that they would have long-lasting future relationships ("You're the type who has rewarding relationships throughout life"). The Control condition does not provide false relationship feedback, but rather false "accident prone" feedback (breaking a bone later in life). This study discovered that individuals who were given the Future-Alone condition were more aggressive

than those given the Future-Belonging condition. The researchers concluded that the individuals who were excluded felt the need to lash out against others (Twenge et al., 2001). Another study using the Future-Alone paradigm was conducted by Bernstein and Claypool (2012). This study was conducted to discover whether the negative effects of Cyberball were more severe than the negative effects of the Future-Alone Paradigm. The results of this study showed that the Future-Alone Paradigm had more severe outcomes than Cyberball (Bernstein & Claypool, 2012). It is possible that feedback about one's future self could guide the decision to engage in aggressive versus prosocial behaviors following ostracism—my research tests this idea.

The Present Study

The present study seeks to examine whether giving individuals false feedback about their future personality characteristics, specifically that they will exhibit more aggressive or prosocial tendencies in the future, will result in greater aggressive or prosocial tendencies in the present moment, following an experience of ostracism. Previous research indicated ostracism leads to a variety of negative consequences, but that there is evidence of both increased aggressive and increased prosocial behaviors as well. False feedback paradigms, such as the Future-Alone, can manipulate one's perception of their current and future personality traits. To date, no research examined the extent to which these two manipulations could combine to affect fundamental needs, mood, and aggressive and prosocial behaviors.

In the present study, participants will be asked to complete an ostracism recall task, then receive false feedback about their personality before completing evaluations of fundamental needs, mood, social pain, and aggression. Three false feedback conditions will be utilized: 1) False-prosocial (increased contact with others in the future); 2) False-social aggressive (negative

social behaviors will push people away in the future); and 3) False-physical aggressive (negative physical behaviors will push people away in the future).

I examined several hypotheses. First, ostracized participants will experience greater negative mood, increased social pain, lowered basic needs, and increased aggressive behaviors compared to included participants. Next, we hypothesize that participants given false-aggressive feedback (either social or physical aggression) will report lower basic needs, greater negative mood, increased social pain, and increased aggressive behaviors compared to participants given false-prosocial feedback. We will also explore differences as a function of false-social versus false-physical aggressive feedback. Finally, we hypothesize an interaction between ostracism and false feedback. In particular, among ostracized participants, those receiving false-aggressive feedback will show lower basic needs, greater negative mood, increased social pain, and increased aggressive behaviors compared to those receiving false-prosocial feedback. Among included participants, no differences will be seen between the false-aggressive and false-prosocial feedback groups in terms of basic needs, mood, social pain, or aggressive behaviors.

Method

Participants

An a priori power analysis indicated a required sample size of 251 participants based on the following parameters: power (1-β) = .95, α = .05, medium effect size for a 2 (Recall condition: ostracized, included) x 3 (false feedback type: social aggressive, physical aggressive, prosocial) ANOVA. Although large effects are often seen for ostracism manipulations, it is unclear whether the false feedback interaction would fall in the medium or large effect range. Therefore, a medium effect is anticipated. We increased the total sample size to account for potential lost data related to online data collection.

A total of 838 MTurk workers completed the study for $1.25 in compensation. Several were then removed from further analyses due to: requesting study data be deleted (n = 10), providing off-topic responses to the recall manipulation (n = 129 ostracism, n = 87 inclusion), not responding to the recall manipulation (n = 1), or reporting being distracted, interrupted, or both during testing (n = 50). Participants who were removed for off-topic discussions included instances of participants reporting negative experiences that did not relate to ostracism or providing information copied directly from an internet source such as Wikipedia. This left a final sample of 561 participants (age: M_{age} = 35.21, SD_{age} = 11.84; gender: 209 males, 347 females, 4 transgender; race/ethnicity: 77.9% White/Caucasian, 11.4% Black/African American).

Manipulations and Procedures

The study was approved by the Institutional Review Board and all participants provided informed consent. Participants first completed an assessment of personality characteristics via the Big Five Inventory-2-Short Form (BFI-2-SF; Soto & John, 2017). The 15-item BFI-2-SF measures levels of openness, conscientiousness, neuroticism, agreeableness, and extraversion. Openness refers to an individual's willingness to try new ideas and their ability to be flexible with their plans. Conscientiousness refers to an organizational ability and an individual's desire to do the right thing. Neuroticism is a measure of abnormal levels of emotions, including obsessive behavior and high levels of anxiety. Agreeableness is an individual's friendliness and ability to connect with others. Extraversion is a measure of where individuals derive their energy or where they tend to put most of their energy (outward or inward). This measure is made up of five subscales that measure each of these individual variables separately. The three items that make up each subscale are averaged to create a score on the particular personality characteristic (higher scores are more indicative of that characteristic).

After completing the BFI-2-SF, participants were tasked with completing the recall task while the personality feedback was calculated. Providing the personality feedback is part of the life-alone paradigm, as it is thought to make the false feedback more believable to participants. Participants were randomly assigned to complete an ostracism (n = 267) or inclusion (n = 294) recall task. On this task, participants were asked to recall a time that they were included or ostracized within the past five years, then write about this experience in detail (Appendix B). They were asked not only to recall the time but how they felt about the experience.

Participants then received two pieces of personality feedback (Appendix A). Based on previous studies with the future-life manipulation (e.g., DeWall & Baumeister, 2006), participants received one of the following pieces of false feedback (randomly assigned): 1) false feedback about future prosocial tendencies (n = 197); 2) false feedback about future physical aggressive tendencies (n = 176); or 3) false feedback about future social aggressive tendencies (n = 188). They then received true feedback about one of their Big Five personality characteristics, with the particular characteristic randomly assigned.

The false feedback conditions were created by starting from the Life Alone manipulation presented in Bernstein and Claypool (2012). This manipulation contained two conditions, a future-belonging and a future-alone. The future-belonging condition used wording such as "You're the type who has rewarding relationships throughout life" whereas the future-alone condition used wording such as "You're the type who will end up alone later in life." Using these conditions as a basis, the false feedback conditions for the present study were created by integrating prosocial or aggressive tendencies from the Conflict Tactics measure (Buckley, Winkel, & Leary, 2004). These conflict tactics included such items as "smiling at the other person" (prosocial) and "humiliating the other person in front of others" (aggressive) and were

turned into components such as “smiling at others” and “humiliating others in public” for the present study. The conflict tactics items were coded as either physically aggressive, socially aggressive, or prosocial before being integrated into the appropriate future-feedback condition. The resulting three paragraphs, which combined the future-alone manipulation and the conflict tactics items, were then edited to be the same length.

Measures

Next, participants completed the Tangram Help-Hurt Task (Saleem, Anderson, & Bartlett, 2015) to assess aggressive versus prosocial tendencies. Tangrams are small shapes that participants were asked to use to create larger shapes. Participants watched a video in which the seven tangram pieces were used to create easier and harder target shapes. They were then given the opportunity to assign tangram pieces to another participant, in a separate study, to complete. If the other participant completed all 11 of the assigned tangrams, they would be eligible to receive a gift card (Appendix C). Participants saw a list of 30 target shapes that were divided according to difficulty. Easy tangrams need only one to three pieces to complete. Medium tangrams need four to six pieces to complete. Hard tangrams can only be completed with all seven pieces. This was, in fact, false and simply a measure of their aggressive tendencies toward another individual. If individuals select easy tangrams, they are making it easier for the individual to win the prize. If they select hard tangrams, they are making it more difficult for the individual to win the prize, a type of aggression toward the other person.

After the tangram assignment, participants completed the six-item tangram motivations assessment (Appendix C). Participants indicated their agreement on a 5 point Likert scale (1 = "strongly disagree", 5 = "strongly agree") with six statements to assess their motivations for assigning Tangrams. Several statements assessed motivations to hurt the other participant,

whereas others assessed motivations to help the other participant. Other questions assessed whether participants were motivated by wanting to challenge the other participant with the tangram selections or the motivation to provide a range of tangram puzzles.

Following the tangram task, participants completed assessments of fundamental needs, mood, and social pain. Participants completed Basic Needs and Mood scale which contains questions such as "my self-esteem is high" (Williams et al., 2000). On this measure, 20 items assess the fundamental needs (i.e., belonging, control, self-esteem, meaningful existence) and eight items assess positive and negative mood (the feeling of being sad and insecure) (Appendix D). Participants responded on a 1 (*not at all*) to 5 (*extremely*) scale. Overall, this measure had high internal consistency within our sample (α = .972 for basic needs, α = .963 for mood). Participants also indicated how painful the experience of ostracism (or inclusion) was for them by responding to a series of three questions (Appendix E). For the purposes of the present study, analyses were only conducted on the "How much pain did you feel during the time you recalled" question from the social pain measure.

Next, participants completed several manipulation check items (Appendix F). We asked participants to what extent they felt excluded and ignored during the time they recalled. We also asked participants to estimate the percentage of time they were included during the time they recalled. In addition, we asked several questions regarding the extent to which participants remembered and believed their personality feedback. These questions included items such as "based on the feedback I received about my personality, in the future I will…(be prosocial, be aggressive)," "how accurate was the personality feedback you received," and "to what extent do you believe your personality feedback" (see Appendix F).

To complete the study protocol, participants responded to a series of basic demographic questions assessing age, gender, race/ethnicity, and educational level (Appendix G). We also assessed whether participants were fully focused on the research study (i.e., were distracted, were interrupted) (Appendix H). Participants then saw the debriefing information (Appendix I), which indicated that the personality feedback—except for the Big Five feedback—was in fact false, before receiving their monetary compensation. During the debriefing, participants were given the option to request their data not be used in study analyses.

Data Analysis

As previously mentioned, participants were removed prior to any analyses for the following reasons: 1) experiencing distraction or interruption during testing; 2) providing off-topic responses to the recall task; 3) failure to complete all elements of the study; or 4) requesting their data be removed from further analyses.

Next, the hypotheses were tested. Collectively, main and interaction effects were predicted on the basic needs, mood, social pain, and tangram measures. To assess these hypotheses, a series of 2 (Ostracism condition: ostracism, inclusion) x 3 (False feedback condition: false-prosocial, false-social aggressive, false-physical aggressive) ANOVAs were conducted on each of the outcome variables.

Results

Manipulation Checks

First, independent-samples *t*-tests were conducted to assess whether the ostracism manipulation was effective. Ostracized participants endorsed greater levels of feeling ignored (M = 4.12, SD = 1.15) and excluded (M = 4.46, SD = 0.96) than included participants (M = 1.54, SD = 0.89; M = 1.53, SD = 0.98; respectively), $t_{ignored}(559) = -29.91$, $p < .001$, $t_{excluded}(559) = -35.67$,

$p < .001$. In addition, ostracized participants reported lower levels of inclusion by the group (M = 25.22, SD = 26.75) than included participants (M = 77.94, SD = 23.22), $t(559) = 24.98$, $p < .001$.

Next, one-way ANOVAs were conducted to assess the false feedback manipulation's effectiveness. No significant differences emerged between groups in terms how they currently feel (aggressive versus prosocial), $F(2,558) = 1.13$, $p = .325$. When asked what their personality feedback told them they should be like, participants in the false-social aggressive (M = 3.30, SD = 2.22) and false-physical aggressive (M = 3.29, SD = 2.42) conditions reported they should be more aggressive than those in the false-prosocial condition (M = 1.75, SD = 1.07), $F(2,558)$ = 39.03, $p < .001$. Participants in the false-prosocial condition (M = 5.26, SD = 1.53) reported their feedback was more accurate than participants in the false-social aggressive (M = 2.63, SD = 1.96) or false-physical aggressive (M = 1.98, SD = 1.72) conditions, $F(2,558) = 188.72$, $p < .001$. In addition, participants in the false-prosocial condition (M = 5.05, SD = 1.70) reported their feedback was more believable/real than participants in the false-social aggressive condition (M = 2.43, SD = 1.88), who believed their feedback more than participants in the false-physical aggressive condition (M = 1.97, SD = 1.69), $F(2,558) = 170.40$, $p < .001$.

The remaining analyses test the following hypotheses: 1) ostracism will decrease basic needs, negatively affect mood, increase social pain, and increase aggressive behaviors compared to inclusion (main effect of condition); 2) false-aggressive feedback will decrease basic needs, negatively affect mood, increase social pain, and increase aggressive behaviors compared to false-prosocial feedback (main effect of feedback); 3) among ostracized participants, those receiving false-aggressive feedback will show lower basic needs, worse mood, increased social pain, and increased aggressive behaviors compared to those receiving false-prosocial feedback; and 4) among included participants, no differences will be seen between the false feedback

conditions in terms of basic needs, mood, social pain, or aggressive behaviors. The results are presented according to the particular dependent variable.

Basic Needs

A 3 (Feedback) x 2 (Condition) ANOVA was conducted on the average basic needs score, where higher numbers indicate greater need satisfaction than lower numbers. Basic needs were higher in the inclusion group than in the ostracism group, $F(1,555) = 1532.41$, $p < .001$, $\eta^2 = .734$ (see Table 1 for means and standard deviations). The main effect of feedback was not significant, $F(2,555) = 0.07$, $p = .934$, $\eta^2 = .000$. There was a significant interaction, $F(2,555) = 3.92$, $p = .020$, $\eta^2 = .014$. For each of the false feedback groups, basic needs were greater in the inclusion than in the ostracism group (see Figure 1). Although not significant, there was a trend towards lower basic needs in the false-prosocial than false-social aggressive feedback group within the ostracism condition, $p = .057$.

Mood

A 3 x 2 ANOVA was conducted on mood, where higher numbers indicate more positive mood than lower numbers. The main effect of condition was significant, $F(1,555) = 1703.26$, $p < .001$, $\eta^2 = .754$. A Tukey post-hoc test revealed that mood was higher in inclusion than ostracism, $p < .001$. No significant difference was found in mood as a function of the false feedback condition, $F(2,555) = 0.41$, $p = .663$, $\eta^2 = .001$. In addition, no significant interaction effect was found, $F(2,555) = 1.85$, $p = .159$, $\eta^2 = .007$.

Social Pain

A 3 x 2 ANOVA also helped to determine if social pain differed between groups. Higher scores indicated grater levels of social pain. There was a significant main effect of condition, $F(1,555) = 239.55$, $p < .001$, $\eta^2 = .301$. A Tukey post-hoc test revealed that participants in the

ostracism condition felt significant greater social pain than participants in the inclusion condition, $p < .001$. The ANOVA found no significant differences in social pain between the differing false feedback conditions, $F(2,555) = 0.85$, $p = .428$, $\eta^2 = .003$. Likewise, no significant interaction effect was found, $F(2,555) = 1.10$, $p = .332$, $\eta^2 = .004$.

Tangrams

A series of 3 x 2 ANOVAs were conducted to assess differences in tangram selections by false feedback and ostracism conditions. Three separate ANOVAs were conducted, one each for the easy, medium, and hard tangrams. For the easy tangrams, there was a significant difference in the number of easy tangrams selected as a function of ostracism condition, $F(1,553) = 4.14$, $p = .042$, $\eta^2 = .007$. A Tukey post-hoc test found that those in the ostracism condition selected more easy tangrams than those in the inclusion condition, $p = .042$. There were no significant results for easy tangram assignment as a factor of the false feedback condition, $F(2,553) = 0.27$, $p = .765$, $\eta^2 = .001$. In addition, the ANOVA revealed no differences in easy tangram selection as an interaction of the ostracism condition and the false feedback condition, $F(2,553) = 0.21$, $p = .813$, $\eta^2 = .001$.

For the medium tangrams, no significant differences were seen. There was no main effect of ostracism condition, $F(1,553) = 1.15$, $p = .285$, $\eta^2 = .002$. There were also no differences in medium tangram selection as a function of the false feedback condition, $F(2,553) = 1.97$, $p = .141$, $\eta^2 = .007$. Finally, there were no differences in medium tangram selection as an interaction of the ostracism condition and the false feedback condition, $F(2,553) = 1.72$, $p = .179$, $\eta^2 = .006$.

The final ANOVA did not reveal any significant differences. There was not a main effect of the ostracism condition on the selection of hard tangrams, $F(1,553) = 2.45$, $p = .118$, $\eta^2 = .004$. In addition, there were no differences in hard tangram selection as a function of feedback

condition, $F(2,553) = 0.36$, $p = .699$, $\eta^2 = .001$. In addition, there were no differences in hard tangram selection as an interaction of the ostracism condition and the false feedback condition, $F(2,553) = 1.04$, $p = .353$, $\eta^2 = .004$.

Exploratory Analyses

Several additional analyses were conducted to test additional post-hoc hypotheses.

Tangram motivations. First, we also examined the reasons for selection of tangrams in another series of 3 x 2 ANOVAs. The first ANOVA was conducted to determine if there was a difference in choosing tangrams in order to help the participant get the gift card. There was not a main effect of feedback condition, $F(2,555) = 0.95$, $p = .387$, $\eta^2 = .003$. There was also not a main effect of ostracism condition, $F(1,555) = 0.00$, $p = .985$, $\eta^2 = .000$. The interaction was also not significant, $F(2,555) = 0.75$, $p = .474$, $\eta^2 = .003$.

Next, we examined whether there was a difference in choice of tangrams in order to harm chances of winning the gift card. Feedback condition had no significant effect, $F(2,555) = 2.59$, $p = .076$, $\eta^2 = .009$. There were also no significant differences due to the ostracism $F(1,555) = 0.64$, $p = .425$, $\eta^2 = .001$. Finally, there were no interaction effects, $F(2,555) = 0.39$, $p = .677$, $\eta^2 = .001$.

The third set of analyses examined the variable of the desire to help the participant. There was not a significant effect of feedback, $F(2,555) = 0.87$, $p = .421$, $\eta^2 = .003$. In addition, ostracism condition was not significantly related to participants' choice to help the fake participant solve the tangram puzzles, $F(1,555) = 1.74$, $p = .188$, $\eta^2 = .003$. Also, no significant interaction effect emerged between the feedback condition and the ostracism condition, $F(2,555) = 0.74$, $p = .480$, $\eta^2 = .003$.

In terms of endorsing the statement *I wanted to hurt the other participant* when choosing the tangrams, there was no significant effect of false feedback, $F(2,555) = 2.26$, $p = .106$, $\eta^2 = .008$, or of ostracism condition, $F(1,555) = 0.04$, $p = .840$, $\eta^2 = .000$. Lastly, the ANOVA revealed no interaction effects on tangram selections, $F(2,555) = 0.91$, $p = .401$, $\eta^2 = .003$.

The final two tangram motivations questions focused on the extent to which the participant wanted to challenge (1) or provide a range of tangrams (2). There was no main effect of ostracism condition the intent to challenge, $F(1,555) = 2.66$, $p = .103$, $\eta^2 = .005$, but included participants ($M = 3.50$) more often indicated they wanted to provide a range of tangrams than did ostracized participants ($M = 3.23$), $F(1,555) = 4.67$, $p = .031$, $\eta^2 = .008$. There was no main effect of false feedback condition on either question, (1) $F(2,555) = 0.71$, $p = .490$, $\eta^2 = .003$, (2) $F(2,555) = 1.62$, $p = .200$, $\eta^2 = .006$. Finally, no interaction effects emerged for either question, (1) $F(2,555) = 0.21$, $p = .811$, $\eta^2 = .001$, (2) $F(2,555) = 0.63$, $p = .532$, $\eta^2 = .002$. Taken together, the reasons for selecting tangrams do not appear to explain the current research findings.

Tangram order effects. It is possible that the presentation order affected tangram selections. Two tangram orders were utilized: 1) easy-medium-hard, and 2) hard-medium-easy. A series of independent-samples *t*-tests were conducted to assess order effects on the tangram selections for each level. More easy tangrams, $t(557) = 19.96$, $p < .001$, and fewer hard tangrams, $t(557) = -19.66$, $p < .001$, were selected when the tangrams were presented in order 1 than in order 2 (see Figure 2). No differences were seen for the medium tangrams, $t(557) = -1.26$, $p = .209$.

Due to these tangram order effects, we repeated the previous 3 x 2 ANOVAs on the tangram selections as 3 (false feedback condition) x 2 (ostracism condition) x 2 (tangram order) ANOVAs. This was done to determine if the tangram presentation order interacted with the

study variables to affect outcomes. Here, only the main effect of tangram order and its interactions with feedback and ostracism condition are presented. First, easy tangram selections were examined. The main effect of tangram order was significant, $F(1,547) = 389.04$, $p < .001$, $\eta^2 = .416$, as participants chose more easy tangrams when they were presented first ($M = 57.99$) than when presented last ($M = 18.40$). But, tangram order did not interact with false feedback condition, $F(2,547) = 1.68$, $p = .187$, $\eta^2 = .006$, nor with ostracism condition, $F(1,547) = 0.33$, $p = .565$, $\eta^2 = .001$. Finally, the three-way interaction was not significant, $F(2,547) = 0.31$, $p = .736$, $\eta^2 = .001$.

Next, the tangram order effects were examined for the medium tangrams. The order in which the tangrams were presented had no effect on medium tangram selection, $F(1,547) = 1.60$, $p = .206$, $\eta^2 = .003$. The interaction between tangram order and ostracism condition also had no effect on the number of medium tangrams selected, $F(1,547) = 0.39$, $p = .535$, $\eta^2 = .001$. There was no interaction between the false feedback condition and tangram order, $F(2,547) = 1.42$, $p = .243$, $\eta^2 = .005$. The final, three-way interaction was not significant, $F(2,547) = 1.27$, $p = .283$, $\eta^2 = .005$.

Finally, the hard tangrams were examined. The tangram order affected the amount of hard tangrams selected by participants, $F(1,547) = 378.18$, $p < .001$, $\eta^2 = .409$, as more hard tangrams were chosen when they were presented first ($M = 53.68$) than last ($M = 15.70$). Tangram order did not interact with ostracism condition, $F(1,547) = 0.04$, $p = .853$, $\eta^2 = .000$, nor did it interact with false feedback condition, $F(2,547) = 1.01$, $p = .365$, $\eta^2 = .004$. The final interaction of the ostracism condition, the false feedback condition, and the tangram order condition did not significantly impact participants choice on choosing hard tangrams $F(2,547) = 1.66$, $p = .191$, $\eta^2 = .006$. Taken together, although main effects of tangram presentation order

appeared for the easy and medium tangram selections, order did not interact with either of the two manipulations (false feedback, ostracism) to affect selections.

Discussion

The present study found mixed support for the study hypotheses. The first hypothesis was that ostracized participants would experience greater negative mood, increased social pain, lowered basic needs, and increased aggressive behaviors compared to included participants. The study results largely support this hypothesis. First and foremost, the ostracism manipulation worked: participants reported being more included and less ignored in the inclusion versus ostracism condition. Ostracized participants experienced lowered fundamental needs, worse mood, and greater social pain compared to included participants, consistent with previous research indicating the harmful effects of ostracism (e.g., Rajchert & Winiewski, 2016). With regard to aggression, the only significant main effect of ostracism condition was on the number of easy tangrams selected, in that ostracized participants selected more easy tangrams than included participants. This finding runs counter to previous research suggesting increased aggressive tendencies following ostracism (e.g., Chen et al., 2012; Ren, Wesselmann, & Williams, 2018) but is consistent with those indicating increased prosocial behaviors instead (Maner et al., 2007).

Limited support was found for the second hypothesis, that false-aggressive feedback leads to lower basic needs, greater negative mood, increased social pain, and increased aggressive behaviors compared to false-prosocial feedback. Although participants in all three feedback conditions were able to remember their feedback, false feedback condition was not associated with altered fundamental needs, mood, or social pain, nor with aggressive behaviors on the tangram task. These findings are counter to some of the previous literature, which

indicated mood and fundamental needs are altered by false positive and negative feedback (e.g., Twenge et al., 2001). Exploratory analyses indicated that participants in the false-prosocial feedback condition were more likely to rate their feedback as accurate and believable than participants in the false-aggressive (both social and physical) feedback conditions, providing one potential reason for this lack of effect on multiple outcome measures. This finding may be due to the fact that individuals were more prone to believing favorable false feedback than negative false feedback.

Finally, no support was found for the hypotheses regarding interactions between ostracism and false feedback conditions. Only one significant interaction emerged, that for fundamental needs. However, this interaction only showed that basic needs were higher in inclusion than ostracism participants across all three of the false feedback groups. There was a slight trend toward lower fundamental needs in the ostracism and false aggressive feedback condition. Individually, both manipulations lead to changes in fundamental needs, mood, and social pain (Iannone et al., 2018; Williams et al., 2000), but in the present study there were limited main effects of false feedback and even fewer interaction effects. It is possible that participants did not have a true "target" to aggress toward in the tangram task, potentially limiting aggressive tendencies. If participants had the chance to act aggressively toward someone who just ostracized them, such as if an ostracism manipulation like Cyberball were used, then the predicted interactions with false future feedback would likely emerge. Individuals may act more aggressively if they had the chance to act against an individual who excluded and ignored them. In addition, the previously described difference in believability of the false feedback may have affected these interaction effects as well.

Several additional exploratory analyses examined two additional theories to explain the present findings. First, the reasons for tangram selections were examined, as they provided a range of prosocial (help) and aggressive (hurt) reasons for selecting the different tangrams. As the only difference that emerged was on whether participants tried to provide a range of tangram selections (inclusion > ostracism), it does not appear that these tangram motivations were a reason for the non-significant effects. A second potential concern was the order in which tangrams were presented (easy-medium-hard, hard-medium-easy). Tangram order did in fact matter, as there were main effects of tangram order on the number of easy and hard tangrams selected. But, tangram order did not interact with ostracism or false feedback condition, indicating that it likely was not the sole cause of any non-significant study findings.

Limitations

There were several limitations that likely affected findings. First, individuals tended to not believe the false feedback was accurate or believable when it was aggressive compared to prosocial. This lack of believability of the aggressive feedback, or conversely, over-believability of the prosocial feedback, could skew results towards individuals reacting to ostracism more in the prosocial than in the aggressive condition. The previously noted tangram order effect is another limitation. Participants seemed to choose the tangrams that were presented first, which may have negatively impacted the results of the study. Rather than acting out of aggression or a prosocial tendency, participants seemed to act out of convenience. Future studies should use several methods to assess aggressive and prosocial tendencies to increase the chances these tendencies are assessed rather than another variable. Finally, it is possible the strong ostracism condition effects might have overpowered the likely smaller effects of the false feedback condition. This potential inconsistency in power of the manipulations should be considered in

future studies. Another limitation was the use of the BFI-2-SF. It could be that the limited number of questions made the participants hesitant to believe we could conclude so much about them. Another concern was the mixing feedback presentation formats. The false feedback was presented in paragraph form while the true feedback was presented as a numbered score. This difference may have affected the believability of the feedback they received. Future research should consider adjusting the true and false feedback formats to be consistent in how they are presented to participants.

Conclusions

The present study determined that recalling a previous experience of ostracism does increase negative mood, lower fundamental needs, and increase social pain, but these effects are not tempered by the presence of either false-aggressive or false-prosocial feedback. Several limitations, including order effects from the tangram selections and believability in the false feedback conditions, likely affected these results. Future research should examine false aggressive feedback and ostracism when participants can practice direct aggression against an individual who they believe has ostracized them. Previous research suggests that individuals may be more aggressive towards those who have ostracized them (DeBono & Muraven, 2014). A manipulation, such as Cyberball, could allow participants to practice direct aggression towards another who recently ostracized them (Williams & Jarvis, 2006). Because Cyberball involves a virtual game of toss between the participant and two other fictitious players, the study could ask the participant to assign tangrams to the other players that ostracized them. Another avenue of future research may be to focus on prosocial feedback conditions, as participants seemed to believe them more than the aggressive feedback conditions. This could include seeing how receiving prosocial feedback before being ostracized affects individuals versus after an

experience of ostracism. It could also include presenting false prosocial feedback and seeing its effects on an individual's cognitive performance on decision making tasks. Regardless of the other effects, no differences were found between false social aggressive and false physical aggressive feedback, meaning these two could be combined in future research endeavors.

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Table 1. Variable Means and Standard Deviations

Main Effect of Ostracism Condition

Variable	Inclusion		Ostracism	
	M	*SD*	*M*	*SD*
Basic Needs	3.94	0.58	1.88	0.66
Mood	4.40	0.64	2.02	0.73
Social Pain	10.56	20.22	44.47	30.50
Tangrams: Easy	36.31	29.79	41.56	31.20
Tangrams: Medium	27.69	15.07	26.32	14.62
Tangrams: Hard	35.99	29.18	32.12	29.97

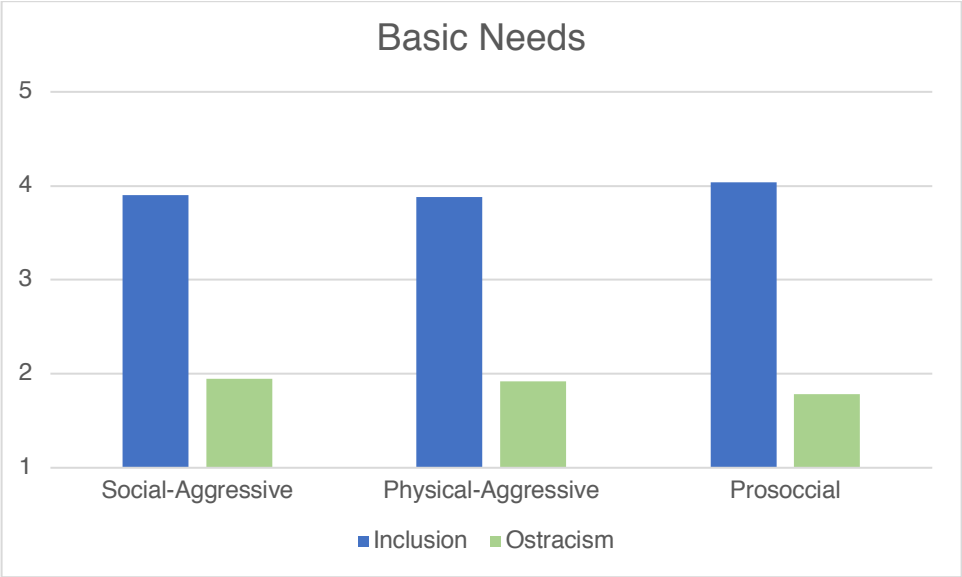
Main Effect of False Feedback Condition

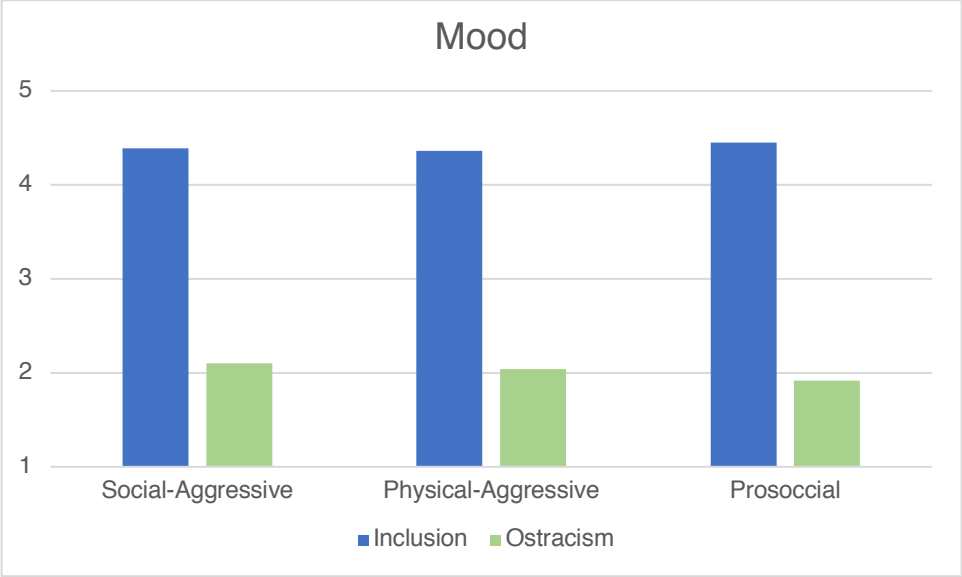
Variable	Social Aggressive		Physical Aggressive		Prosocial	
	M	*SD*	*M*	*SD*	*M*	*SD*
Basic Needs	2.97	1.19	3.02	1.15	2.89	1.27
Mood	3.29	1.37	3.34	1.33	3.17	1.41
Social Pain	25.26	30.19	25.03	29.82	29.56	31.91
Tangrams: Easy	37.48	29.07	39.05	31.82	39.85	30.88
Tangrams: Medium	28.35	14.22	25.20	15.09	27.44	15.16
Tangrams: Hard	34.17	28.61	35.76	31.18	32.71	29.14

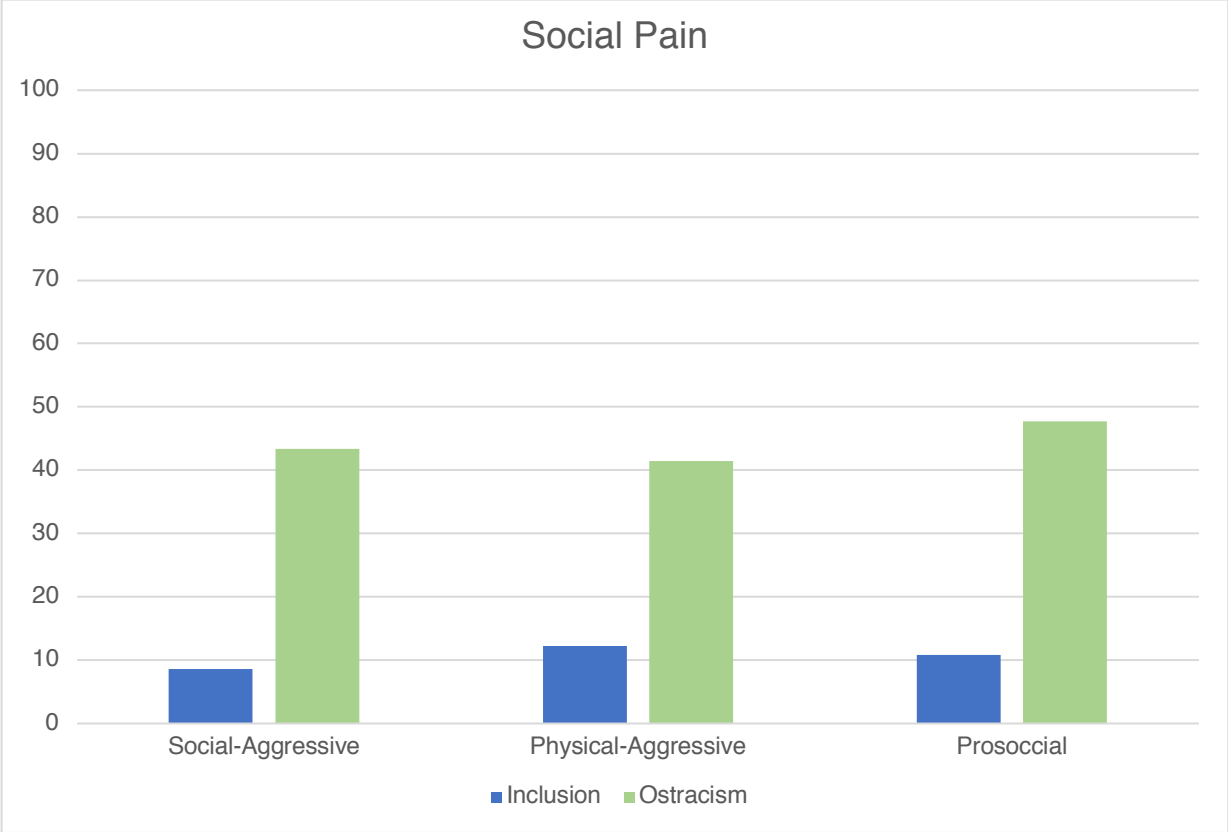
Interaction Between False Feedback and Ostracism Conditions

Variable	Social Aggressive				Physical Aggressive				Prosocial			
	Inclusion		Ostracism		Inclusion		Ostracism		Inclusion		Ostracism	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Basic Needs	3.90	0.62	1.95	0.75	3.88	0.62	1.92	0.57	4.04	0.50	1.78	0.65
Mood	4.39	0.68	2.10	0.82	4.36	0.71	2.04	0.60	4.45	0.50	1.92	0.72
Social Pain	8.61	16.05	43.39	31.57	12.25	22.85	41.45	29.81	10.80	21.15	47.76	30.06
Tangrams: Easy	34.16	28.37	41.14	29.54	36.50	31.40	42.29	32.26	38.30	29.68	41.36	32.09
Tangrams: Medium	29.12	13.90	27.50	14.61	24.47	15.40	26.12	14.74	29.51	15.49	25.43	14.63
Tangrams: Hard	36.72	28.57	31.35	28.54	39.03	31.82	31.59	30.03	32.20	26.78	33.21	31.39

Figure 1. *Interactions between feedback and ostracism conditions on study variables.*






Social Pain
100
90
80
70
60
50
40
30
20
10
0
Social-Aggressive
Physical-Aggressive
Prosoccial
Inclusion
Ostracism

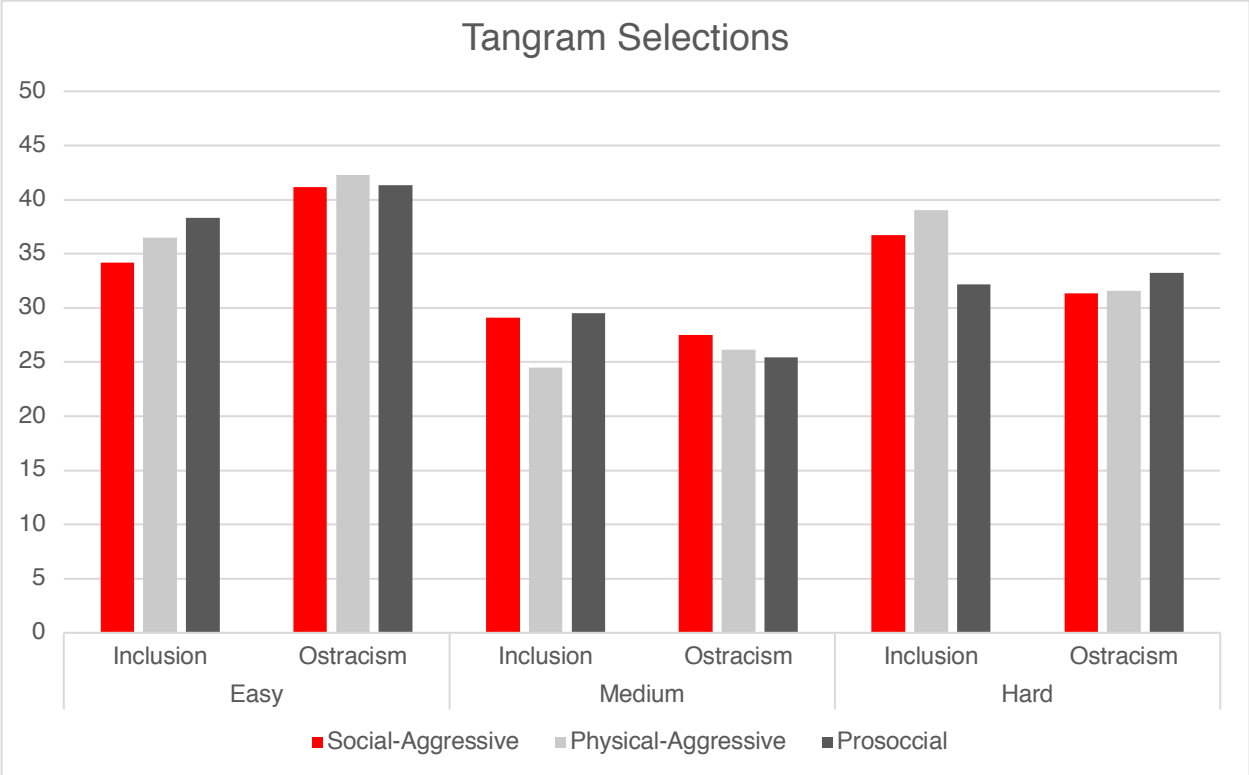
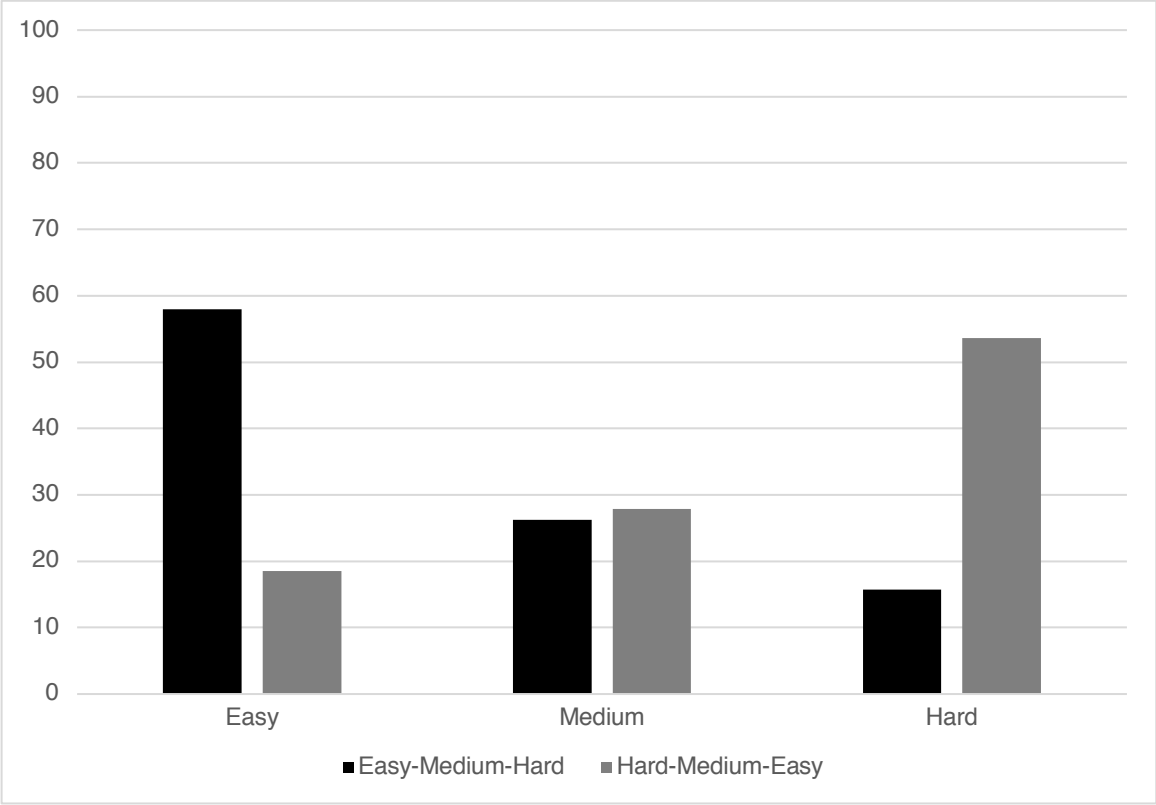

Tangram Selections
50
45
40
35
30
25
20
15
10
5
0
Inclusion
Ostracism
Inclusion
Ostracism
Inclusion
Ostracism
Easy
Medium
Hard
Social-Aggressive
Physical-Aggressive
Prosoccial

Figure 2. *Tangram selections (% selections) by presentation order.*



Appendix A

True and False Feedback Prompts

False feedback will be randomly assigned. False feedback will include one of the following options, and will occur immediately prior to the randomized true feedback:

False Prosocial

Your personality results show several new personality traits will begin to emerge in your future. You will start to smile at others more and show more interest in others. Our analysis shows you will complement others more, which will boost their self-esteem. Our results show you will start to use more positive ways of communicating with others, including compliments and humor. Odds are, your presence will begin to put people at ease.

False Social Aggressive

Your personality results show several new personality traits will begin to emerge in your future. You will start to frown at others more and begin to push others out of your life. Our analysis shows you will begin humiliating others, which will harm their self-esteem. Our results show you will start to use more negative ways of communicating, including insulting and yelling. Odds are, your presence will begin to put people on edge.

False Physical Aggressive

Your personality results show several new personality traits will begin to emerge in your future. You will start to physically threaten others more and begin to hurt others physically. Our analysis shows you will begin physically harming others, which will harm their self-esteem. Our results show that you will start to use physical threats to communicate with others, including bodily harm and property damage. Odds are, your presence will begin to make others fearful for their physical safety.

True feedback will be randomly assigned, in that each participant will randomly receive true feedback about one of the big five characteristics. True feedback will include one of the following options:

True extraversion

Based on your responses to the personality questionnaire, you scored _____ out of 5.00 on items related to extraversion.

1-2 = not at all extraverted (aloof, isolated, quiet, passive, cautious)

2-3 = somewhat extraverted

3-4 = moderately extraverted

4-5 = extremely extraverted (cordial, sociable, dominant, daring)

True agreeableness

Based on your responses to the personality questionnaire, you scored _____ out of 5.00 on items related to agreeableness.

1-2 = not at all agreeable (skeptical, stingy, oppositional, confident, tough)

2-3 = somewhat agreeable

3-4 = moderately agreeable

4-5 = extremely agreeable (trusting, giving, cooperative, meek, empathetic)

True openness

Based on your responses to the personality questionnaire, you scored _____ out of 5.00 on items related to openness to experience.

1-2 = not at all open (concrete, uninvolved, routine, rigid, inflexible)

2-3 somewhat open

3-4 moderately open

4-5 extremely open (imaginative, aesthetic, unconventional, creative, permissive)

True conscientiousness

Based on your responses to the personality questionnaire, you scored _____ out of 5.00 on items related to conscientiousness.

1-2 = not at all conscientious (lax, disorganized, casual, careless)

2-3 = somewhat conscientious

3-4 = moderately conscientious

4-5 = extremely conscientious (efficient, organized, rigid, cautious)

True neuroticism

Based on your responses to the personality questionnaire, you scored _____ out of 5.00 on items related to neuroticism (sensitive/nervous versus secure/confident).

1-2 = not at all neurotic (relaxed, even-tempered, controlled, clear-thinking)

2-3 somewhat neurotic

3-4 moderately neurotic

4-5 extremely neurotic (apprehensive, bitter, urgency, fragile)

Appendix B

Recall Task Instructions

Ostracism Manipulation

Please recall the worst time in the last five years of your life when you were rejected or excluded by a group. In the space below, type in what happened (step-by-step, in order as it happened). Take as much time as you need.

How did you feel when you experienced being rejected or excluded? Please try to be as specific as possible. Take as much time as you need.

Inclusion Manipulation

Please recall a time in the last five years of your life when you were accepted or included by a group. In the space below, type in what happened (step-by-step, in order as it happened). Take as much time as you need.

How did you feel when you experienced being accepted or included? Please try to be as specific as possible. Take as much time as you need.

Appendix C

Tangram Help-Hurt Task

Tangrams are seven different shapes that are used to form different kinds of outlines. Some of these shapes require only a few pieces and are easier to solve. Others will require all seven pieces and will be harder to solve.

Please view the short video clip below that explains how to solve tangrams. Please make sure your audio is set to a reasonable volume so that you can hear the instructions.

You are not going to assign 11 tangram puzzles to a participant in another study. They will need to solve the 11 tangram puzzles in 10 minutes. The other player will be eligible to win a $25 gift certificate if they complete 11 tangrams in 10 minutes. If they fail to solve the 11 tangrams you assigned to them within the time limit, they will not be able to win the gift certificate. However, please remember that the other participant will not see you or know who you are, so feel free to assign them any tangrams you wish.

Please select 11 tangram puzzles to assign from the list of 30 items below.

Tangram Motivations

We would like to know why you chose the tangrams you selected for the participant in the other study.

1 strongly disagree 2 3 4 5 strongly agree

I chose the tangrams because…

_____ I wanted to help the other participant win the gift card

_____ I wanted to make it difficult for the other participant to get the gift card

_____ I wanted to help the other participant

_____ I wanted to hurt the other participant

_____ I wanted to challenge the other participant

_____ I wanted to provide a range of tangrams

Appendix D

Basic Needs and Mood (Williams, Cheung, & Choi, 2000) – For each question, please select the response that best represents the feelings you are experiencing RIGHT NOW.						
		Not at all				Extremely
1	I feel "disconnected."	1	2	3	4	5
2	I feel rejected.	1	2	3	4	5
3	I feel like an outsider.	1	2	3	4	5
4	I feel I belonged to a group.	1	2	3	4	5
5	I feel the other players interacted with me a lot.	1	2	3	4	5
6	I feel good about myself.	1	2	3	4	5
7	My self-esteem is high.	1	2	3	4	5
8	I feel liked.	1	2	3	4	5
9	I feel insecure.	1	2	3	4	5
10	I feel satisfied.	1	2	3	4	5
11	I feel powerful.	1	2	3	4	5
12	I feel I had control over the course of the game.	1	2	3	4	5
13	I feel I had the ability to significantly alter the course of the game.	1	2	3	4	5
14	I feel I was unable to influence the action of others.	1	2	3	4	5
15	I feel the other people decided everything.	1	2	3	4	5
16	I feel invisible.	1	2	3	4	5

17	I feel meaningless.	1	2	3	4	5
18	I feel non-existent.	1	2	3	4	5
19	I feel important.	1	2	3	4	5
20	I feel useful	1	2	3	4	5
21	I feel ignored	1	2	3	4	5
22	I feel excluded	1	2	3	4	5
23	I have high self-esteem	1	2	3	4	5
24	How much pain are you in?	1	2	3	4	5
25	I feel good	1	2	3	4	5
26	I feel bad	1	2	3	4	5
27	I feel friendly	1	2	3	4	5
28	I feel unfriendly	1	2	3	4	5
29	I feel angry	1	2	3	4	5
30	I feel pleasant	1	2	3	4	5
31	I feel happy	1	2	3	4	5
32	I feel sad	1	2	3	4	5

Appendix E

Social Pain

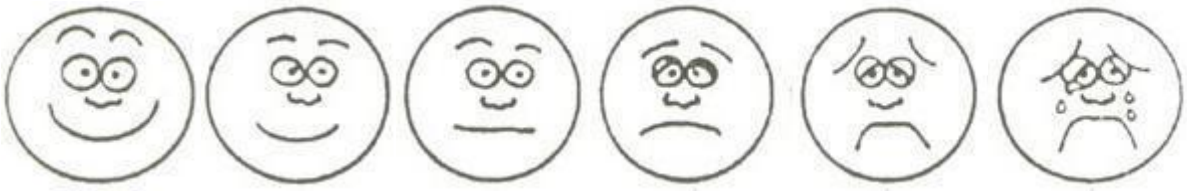
How much pain did you feel during the time you recalled?

0 10 20 30 40 50 60 70 80 90 100
(no pain sensation) (most intense pain sensation)

How unpleasant was the pain you felt during the time you recalled?

0 10 20 30 40 50 60 70 80 90 100
(not at all unpleasant) (most unpleasant imaginable)

Please choose the face that best describes how you felt during the time you recalled:



Appendix F

Manipulation Checks

How are you currently feeling?

1	2	3	4	5	6	7
Prosocial (helping others)						Aggressive (harming others)

Based on the feedback I received about my personality, in the future I will:

1	2	3	4	5	6	7
Be prosocial (help others)						Be aggressive (harm others)

What was the personality feedback you received? _____

How accurate was the personality feedback you received? _____

To what extent do you believe your personality feedback is accurate?

1	2	3	4	5	6	7
Not at all accurate						Very accurate

Do you believe your personality feedback?

1	2	3	4	5	6	7
Definitely not believe						Definitely believe

What percentage of the time were you included **DURING THE CYBERBALL GAME?**

0	10	20	30	40	50	60	70	80	90	100

What did you think this study was about? _____

Appendix G

Demographics

What is your age?

Gender:

Male	Female	Transgender
Not listed	Prefer not to answer	

Educational Level:

Kindergarten through 8th grade	9th through 11th grade
12th grade, no diploma	12th grade, degree
Some college	Associate's degree
Bachelor's degree	Master's degree
Professional degree	Doctorate degree

Your race/ethnic group:

American Indian or Alaska Native	Asian
Black or African American	White
Native Hawaiian or other Pacific Islanders	
More than one race	Other or unknown

Are you:

Hispanic or Latino	Not Hispanic or Latino

What is your nationality?

US Citizen	Other

What language do you mostly speak?

English	Spanish
Chinese	French
Japanese	German
Other	

Appendix H

Funnel Debriefing

Please answer the following questions honestly. Your responses will, in no way, affect your compensation for participating. We simply are interested in how people complete these studies in the real world.

Did you complete the study in one sitting, or were you interrupted (e.g., by a phone call or conversation)?

One sitting
I was interrupted

Did you complete the study in a quiet space, free from distractions like loud noises, passing cars, televisions, and pop-up windows?

I was NOT distracted
I was distracted

Did you complete this study in private, such that you felt free responding with your own thoughts and feelings, or did other people influence your responses?

I had total privacy
Other people influenced my responses

Did you complete this study on a computer with a full screen or another device (tablet, phone) with a smaller screen?

Full screen
Small screen

Appendix I

Debriefing

Thank you for your participation in the Predictors of Cognitive Task Performance study. If you have any questions regarding this study, please contact Melissa Buelow, Ph.D., at buelow.11@osu.edu. If you have any questions regarding your rights as a research participant or to discuss study-related concerns, please contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

As part of the study, participants were randomly assigned to several different experimental conditions. In one, some participants were asked to recall a time they were included, and some participants were not. In the second condition, some participants were given false negative feedback about their future relationships, and some participants were given false positive feedback about their future relationships. It is important for you to know that all feedback you received about your future relationships was false. You did, however, receive accurate feedback about your level of <extraversion/agreeableness/conscientiousness/openness/neuroticsm>.

The main purpose of the study was to see whether your recall and the false feedback you were given about your future relationships affected performance on later tasks. It is important to keep the specifics of this study and the experimental manipulations in confidence so as not to affect other participant responses.